

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Ban Kuan Koay

Serial No.: 10/767,508

Examiner: Mansour M. Said

Filing Date: January 28, 2004

Group Art Unit: 2629

Title: Regulating a Light Source in an Optical Navigation Device

COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria VA 22313-1450

TRANSMITTAL LETTER FOR RESPONSE/AMENDMENT

Sir:

Transmitted herewith is/are the following in the above-identified application

- ☒ Response/Amendment ☐ Petition to extend time to respond  
☐ New fee as calculated below ☐ Supplemental Declaration  
☐ No additional fee (Address envelope to "Mail Stop Amendments")  
☐ Other (Fee \$\_\_\_\_)

CLAIMS AS AMENDED BY OTHER THAN A SMALL ENTITY						
(1) FOR	(2) CLAIMS REMAINING AFTER AMENDMENT	(3) NUMBER EXTRA	(4) HIGHEST NUMBER PREVIOUSLY PAID FOR	(5) PRESENT EXTRA	(6) RATE	(7) ADDITIONAL FEES
TOTAL CLAIMS		MINUS		= 0	X 5.0	\$ 0
INDEP. CLAIMS		MINUS		= 0	X 2.00	\$ 0
<input type="checkbox"/> FIRST PRESENTATION OF A MULTIPLE DEPENDENT CLAIM					X 360	\$ 0
EXTENSION FEE	1 <sup>ST</sup> MONTH 120.00 <input type="checkbox"/>	2 <sup>ND</sup> MONTH 450.00 <input type="checkbox"/>	3 <sup>RD</sup> MONTH 1020.00 <input type="checkbox"/>	4 <sup>TH</sup> MONTH 1590.00 <input type="checkbox"/>		\$ 0
					OTHER FEES	\$ 0
					TOTAL ADDITIONAL FEE FOR THIS AMENDMENT	\$ 0

Charge \$0 to Deposit Account 50-3718 At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 50-3718 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 50-3718 under 37 CFR 1.16, 1.17, 1.19, 1.20 and 1.21. A duplicate copy of this transmittal letter is enclosed

Respectfully submitted,

Ben Kuan Koay

By



Thomas F. Woods  
Attorney/Agent for Applicant(s)

I hereby certify that this correspondence is being deposited with the United States Postal Service as First class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450

Date of Deposit:

Typed Name: Thomas F. Woods

Signature: \_\_\_\_\_

Reg No. 35,726

Date: May 31, 2007

Telephone No. (303) 823-6560

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Ban Kuan Koay

Examiner Name: Mansour M. Said

Serial No.: 10/767,508

Group Art Unit: 2629

Filed: January 28,

Attorney Docket No.: 70030730-1

Confirmation No.: 5958

Title: Regulating a Light Source in an Optical Navigation Device

**RESPONSE AND AMENDMENT**

Commissioner for Patents  
P.O. Box 1450  
Arlington, VA 22313-1450

Sir:

In response to the Office Action dated March 8, 2007, applicants respectfully request entry of the amendments set forth herein, and allowance of the above-identified patent application:

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DATE OF DEPOSIT: May 31, 2007

**CERTIFICATE OF ELECTRONIC DEPOSIT:** I hereby certify that all paper(s) described herein are being filed electronically with the United States Patent and Trademark Office on the date indicated above and addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Signature: Thomas F. Woods

Printed Name: Thomas F. Woods, Reg. No. 36,726

**I. Amendments**

**A. In the Claims**

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of the Claims**

Please cancel claim 18, and amend claims 10 and 19 as follows:

1. (original) An optical navigation device comprising:  
an adjustable light source disposed to emit light onto a surface;  
a sensor disposed to receive light reflected from said surface, wherein light received by said sensor is used to measure movement of said optical navigation device relative to said surface; and  
a light-sensitive device coupled to said light source, said light-sensitive device disposed to receive light from said light source to regulate light emitted from said light source according to a level of light received at said light-sensitive device.
2. (original) The optical navigation device of Claim 1 wherein light received by said light-sensitive device is reflected from said surface.
3. (original) The optical navigation device of Claim 1 wherein said light-sensitive device generates an output indicative of said level of light received by said light-sensitive device, wherein said light source is adjusted according to said output.

4. (original) The optical navigation device of Claim 3 further comprising circuitry coupled to said light-sensitive device, said circuitry receiving said output and comparing said output to a threshold level, wherein said light source is adjusted according to a result of said comparing.

5. (original) The optical navigation device of Claim 4 wherein said output from said light-sensitive device comprises an electrical current and wherein said threshold level comprises a threshold voltage, wherein said circuitry converts said electrical current into a voltage that is compared to said threshold voltage.

6. (original) The optical navigation device of Claim 5 wherein said circuitry further comprises a selectable gain for application to said electrical current.

7. (original) The optical navigation device of Claim 4 wherein said result of said comparing regulates a variable resistor coupled to said light source, said variable resistor regulating said light source.

8. (original) The optical navigation device of Claim 1 wherein said light source comprises a light-emitting diode.

9. (original) The optical navigation device of Claim 1 wherein said light-sensitive device comprises a photodiode.

10. (currently amended) An optical navigation method comprising:  
receiving a light at a sensor, said light emitted by a light source and reflected from a surface, wherein light received at said sensor is used to measure movement of an optical navigation device relative to said surface;  
receiving light at a light-sensitive device, wherein light received by said light-sensitive device is also emitted by said light source; and  
regulating said light source according to a level of light received at said light-sensitive device.

11. (original) The optical navigation method of Claim 10 wherein light received at said light-sensitive device is reflected from said surface.

12. (original) The optical navigation method of Claim 10 wherein said regulating further comprises:

generating a signal indicative of said level of light received at said light-sensitive device; and

adjusting said light source according to said signal.

13. (original) The optical navigation method of Claim 12 further comprising:

comparing said signal to a threshold level; and

making an adjustment to said light source according to a result of said comparing.

14. (original) The optical navigation method of Claim 13 wherein said comparing further comprises:

converting said signal from an electrical current into a voltage; and

comparing said voltage to a threshold voltage.

15. (original) The optical navigation method of Claim 14 wherein said converting further comprises:

amplifying said electrical current according to a selectable amplifier gain.

16. (original) The optical navigation method of Claim 13 wherein said making an adjustment further comprises:

regulating a variable resistor according to said result of said comparing, wherein said variable resistor regulates said light source.

17. (original) The optical navigation method of Claim 10 wherein said light source comprises a light-emitting diode and said light-sensitive device comprises a photodiode.

18. (cancelled) An optical navigation device comprising:  
a light source that emits light onto a surface, wherein light reflected from said surface is used by said optical navigation device to detect movement relative to said surface; and  
a light-regulating device coupled to said light source to measure light reflected from said surface so as to regulate light emitted from said light source.

19. (currently amended) An optical navigation device comprising:  
a light source that emits light onto a surface, wherein light reflected from said surface is used by said optical navigation device to detect movement relative to said surface; and  
a light-regulating device coupled to said light source to measure light reflected from said surface so as to regulate light emitted from said light source, said light regulating device comprising ~~The optical navigation device of Claim 18 wherein said light-regulating device comprises:~~ a light-sensitive device to generate an output having a magnitude that corresponds to a level of light received by said light-sensitive device from said light source; and  
an electronic circuit coupled to said light-sensitive device, said electronic circuit comparing said output to a threshold and generating an output signal that indicates whether or not said threshold is met.

20. (original) The optical navigation device of Claim 19 further comprising:  
a variable resistor coupled between said electronic circuit and said light source, said variable resistor adjusted using said output signal, said variable resistor used for regulating a level of light emitted by said light source.

21. (original) The optical navigation device of Claim 19 wherein said light source comprises a light-emitting diode and said light-sensitive device comprises a photodiode.

22. (original) The optical navigation device of Claim 19 wherein said output of said light-sensitive device comprises an electrical current and wherein said threshold comprises a threshold voltage, wherein said electronic circuit converts said electrical current into a voltage for comparison to said threshold voltage.

23. (original) The optical navigation device of Claim 22 wherein said electronic circuit further comprises a selectable gain applied to said electrical current, wherein said selectable gain is selected using a control signal.

24. (original) The optical navigation device of Claim 23 further comprising a multiplexer coupled between said electronic circuit and said variable resistors, said multiplexer multiplexing said output signal and said control signal, wherein said variable resistor is regulated using said multiplexed output and control signals.

## **II. Remarks**

Support for the various amendments made to the claims herein may be found throughout the application as filed. Claims 10 and 19 are amended herein. Claim 18 is cancelled herein. Claims 1-17 and 19-24 remain pending.

A March 8, 2007 Office Action (hereafter "Office Action") rejected claims 101-8 and objected to claims 19-24. Claims 1-9 were indicated as being allowable in their originally submitted form.

The present Response and Amendment are submitted in response to the Office Action.



### **III. Rejections of, and Objections to, Claims Made in the Office Action**

In the Office Action mailed March 8, 2007, the Examiner rejected, objected to and allowed claims on the following bases:

- (A) Claim 10 was rejected under the second paragraph of 35 U.S.C. Section 112 as being indefinite;
- (B) Claim 18 was rejected under 35 U.S.C. Section 102(e) as being anticipated by U.S. Patent No. 7,168,047 to Huppi;
- (C) Claims 1-9 were allowed;
- (D) Claims 10-17 were indicated as being allowable if rewritten to overcome the rejection of claim 10 described in (A) above; and
- (E) Claims 19-24 were indicated as being allowable if rewritten in independent form.

Each of the foregoing rejections, objections and allowances is responded to below, where each response references the letter corresponding to each rejection set forth above.

**IV. Responses to Rejections Made in the Office Action**

- (A) Claim 10 is amended herein to overcome the rejection made under the second paragraph of Section 112.

Claim 10 is amended herein to overcome the rejection made under the second paragraph of Section 112.

- (B) Claim 18 is cancelled herein, rendering moot the rejection of such claim under Section 102.

Claim 18 is cancelled herein, rendering moot the rejection of such claim under Section 102.

- (C) Claims 1-9 are allowed.

In the March 8 Office Action, claims 1-9 were allowed. Accordingly, claims 1-9 as originally submitted and recited hereinabove are in condition for issuance.

- (D) Claims 10 through 17 have been rewritten to render same allowable.

The Examiner indicated claims 10-17 would be allowable if claim 10 was amended in conformance with the requirements of the second paragraph of Section 112. Claim 10 has been so amended, as described in (A) above, and accordingly claims 10-17 are now in condition for allowance.


- (E) Claims 19-24 are rewritten in independent form herein and are thus allowable

Per the Examiner's requirements, claims 19-24 have been rewritten in independent form, and thus are now allowable.

**V. Summary**

Claims 1-17 and 19-24 remain pending herein and, as originally presented or as amended herein, are believed to be in condition for allowance. Examination of the application as amended is requested. The Examiner is respectfully requested to contact the undersigned by telephone or e-mail with any questions or comments he may have.

Respectfully submitted,  
Ban Kuan Koay  
By his attorney

  
Thomas F. Woods  
Registration No. 36,726

Date: May 31, 2007

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